

OPISTHOBRANCH FAUNA OF LAKSHADWEEP ISLANDS, INDIA, WITH 52 NEW RECORDS TO LAKSHADWEEP AND 40 NEW RECORDS TO INDIA: PART 1

DEEPAK APTE¹

¹Bombay Natural History Society, Hornbill House, S.B. Singh Road, Mumbai 400 001, Maharashtra, India.
Email: spiderconch@gmail.com

Opisthobranchs are the least studied fauna of India. The present study was carried out in Lakshadweep Archipelago between 2005 and 2009. During the 4-year study a total of 60 species from 25 families were recorded. Of these 60 species, 52 are new records to Lakshadweep and 40 are new records to the Indian coast.

Key words: Opisthobranchs, Lakshadweep, Aeolid, Dorid

INTRODUCTION

Nudibranchs belong to Phylum Mollusca, Class Gastropoda and Subclass Opisthobranchia. These are among the least studied molluscs in India. The work done on Opisthobranchs in India is little and patchy, and the earlier works date back to 1880s by Alder and Hancock (1864), Kelaart (1858, 1859, 1883) and Gardiner (1903). The earliest work on Opisthobranchs in Lakshadweep was by Gardiner (1903). Subsequently, Eliot (1903, 1906, 1909, 1910a, 1910b, 1916), Farran (1905), Hornell (1909), O'Donoghue (1932), Rao (1936, 1952, 1961), Winckworth (1946), Satyamurthi (1952), Gideon *et al.* (1957), Rao and Alagaraswami (1960), Narayanan (1968, 1970), Burn (1970), Rao *et al.* (1974), Valdés *et al.* (1999), and Valdés (2002) worked on the Opisthobranchs from the Indian coast. Recent work on this group is limited. Fontana *et al.* (2001) studied the bioactive substances in Indian nudibranchs. Rudman (1970, 1971, 1980, 1984, 1986, 1990), Yonow (1984a,b, 1986, 1988, 1994, 1996), Gosliner and Willan (1991), Gosliner (1992, 1994, 1995), Gosliner and Behrens (1998), Gosliner and Johnson (1999), Gosliner *et al.* (1996), and Brunckhorst (1993) reviewed the status of various Opisthobranch groups in the Indo-Pacific region.

STUDY AREA

The present study was carried out in the Lakshadweep Archipelago. The smallest Union Territory of India, Lakshadweep is an archipelago of twelve atolls, three reefs and five submerged banks. Of the 36 islands spread across 32 sq. km, each ranging from 0.1 to 4.9 sq. km, only 11 are inhabited. The islands lie scattered in the Arabian Sea about 225-445 km from the Kerala coast. They have a distinct lagoon on the west, whereas the eastern side lacks a lagoon. The depth of the lagoon varies from island to island. The maximum depth in smaller lagoons, such as Kavaratti, Chetlat, Kiltan, Kalpeni, Amini, and Kadmat, is usually up to 4 m. However, in larger lagoons, such as Suheli, Bitra, Bangaram and

Minicoy, it is up to 10 m. The study was conducted from October to April from 2005-2009, each year, at Kavaratti, Agatti, Minicoy, Suheli, Chetlat, Bangaram, Bitra, Kiltan, Kalpeni and Kadmat islands.

METHODOLOGY

Direct search method was used to collect specimens: Detailed notes on behavioural observations were made.

Preservation of specimen: Specimens were stored in ethyl alcohol after studying the morphological characters. Live specimens of each species were photographed for recording true colours. Barring a few specimens, majority of the specimens are available with the author and will be deposited in the BNHS collections.

RESULTS AND DISCUSSION

During the 4-year study a total of 60 species were recorded belonging to 25 families. Of these 60 species, 52 are new records to Lakshadweep. Of these 52 species, 40 are new records to the Indian coast (Table 1). This clearly indicates that Opisthobranchs in India are least studied. Most Opisthobranch species possess bioactive molecules and tremendous potential in medical science; it is therefore essential to undertake extensive taxonomic study of this group.

Description of species recorded in Lakshadweep

Family: Hydatinidae

Hydatina velum (Lightfoot, 1786) (Fig. 1a)

India: Widely distributed both on east and west coast of India.

Extralimital Distribution: Indo-Pacific.

Size: 30 mm.

Description: This is a benthic species. The shell of the species is light and semi-transparent. Centre of body whorl bears one distinct pair of dark brown band. A single brown band present near the spire and at the base of the body whorl.

Table 1: Opisthobranch fauna of Lakshadweep

Family	Species	New Record to Lakshadweep	New Record to India
Hydatinidae	<i>Hydatina velum</i>	-	-
Bullinidae	<i>Bulla ampulla</i>	-	-
Haminoeidae	<i>Haminoea cymbalum</i>	✓	-
Aglajidae	<i>Chelidonura electra</i>	✓	✓
	<i>Chelidonura punctata</i>	✓	✓
Gastropteridae	<i>Sagaminopteron psychedelicum</i>	✓	✓
Aplysiidae	<i>Aplysia dactylomela</i>	-	-
	<i>Aplysia parvula</i>	✓	✓
	<i>Dolabella auricularia</i>	✓	✓
	<i>Dolabrifera dolabrifera</i>	✓	✓
	<i>Stylocheilus striatus</i>	✓	✓
Pleurobranchidae	<i>Pleurobranchus peroni</i>	✓	✓
	<i>Pleurobranchus albiguttatus</i>	✓	✓
	<i>Berthellina cf. delicata</i>	✓	✓
	<i>Euselenops luniceps</i>	✓	-
Smaragdinellidae	<i>Phanerophthalmus smaragdinus</i>	✓	✓
Polybranchiidae	<i>Polybranchia orientalis</i>	✓	-
Volvatellidae	<i>Volvatella vigourouxii</i>	✓	✓
Elysiidae	<i>Elysia ornata</i>	✓	-
	<i>Elysia tomentosa</i>	✓	-
	<i>Thuridilla carlsoni</i>	✓	✓
	<i>Thuridilla gracilis</i>	✓	-
	<i>Thuridilla livida</i>	✓	✓
	<i>Thuridilla vatae</i>	✓	✓
	<i>Plakobanchus ocellatus</i>	✓	-
Notodorididae	<i>Aegires</i> sp.	✓	✓
Gymnodorididae	<i>Gymnodoris</i> sp.	✓	✓
	<i>Gymnodoris ceylonica</i>	✓	-
	<i>Gymnodoris alba</i>	✓	✓
Chromodorididae	<i>Chromodoris cf. setoensis</i>	✓	✓
	<i>Chromodoris fidelis</i>	✓	✓
	<i>Glossodoris cincta</i>	✓	✓
	<i>Hypselodoris maculosa</i>	✓	✓
	<i>Hypselodoris infucata</i>	✓	-
	<i>Hypselodoris maridadilus</i>	✓	✓
Discodorididae	<i>Peltodoris murrea</i>	✓	✓
Kentrodorididae	<i>Jorunna rubescens</i>	-	-
	<i>Jorunna funebris</i>	✓	-
Platydorididae	<i>Platydoris cruenta</i>	✓	✓
Dorididae	<i>Halgerda tessellata</i>	✓	✓
	<i>Asteronotus cespitosus</i>	✓	-
Phyllidiidae	<i>Phyllidia coelestis</i>	✓	✓
	<i>Phyllidia vericosa</i>	✓	✓
	<i>Phyllidia alyta</i>	✓	✓
	<i>Phyllidia marindica</i>	✓	✓
	<i>Phyllidiella pustulosa</i>	-	-
	<i>Phyllidiella rosans</i>	-	-
	<i>Phyllidiella zeylanica</i>	-	-
	<i>Phyllidiopsis phiphensis</i>	✓	✓
	<i>Phyllidiopsis striata</i>	✓	✓
	<i>Phyllidiopsis gemmata</i>	✓	✓
Dendrodorididae	<i>Dendrodoris tuberculosa</i>	✓	-
	<i>Dendrodoris nigra</i>	-	-
Actinocyclusidae	<i>Actinocyclus verrucosus</i>	✓	✓
Tritoniidae	<i>Marianina rosea</i>	✓	✓
Flabellinidae	<i>Flabellina bicolor</i>	✓	✓
Tergipedidae	<i>Phestilla lugubris</i>	✓	✓
Facelinidae	<i>Pteraeolidia ianthina</i>	✓	✓
	<i>Herviella affinis</i>	✓	✓
	<i>Herviella albida</i>	✓	✓
25 families	60 species	52	40

'✓': new record; '-': earlier record

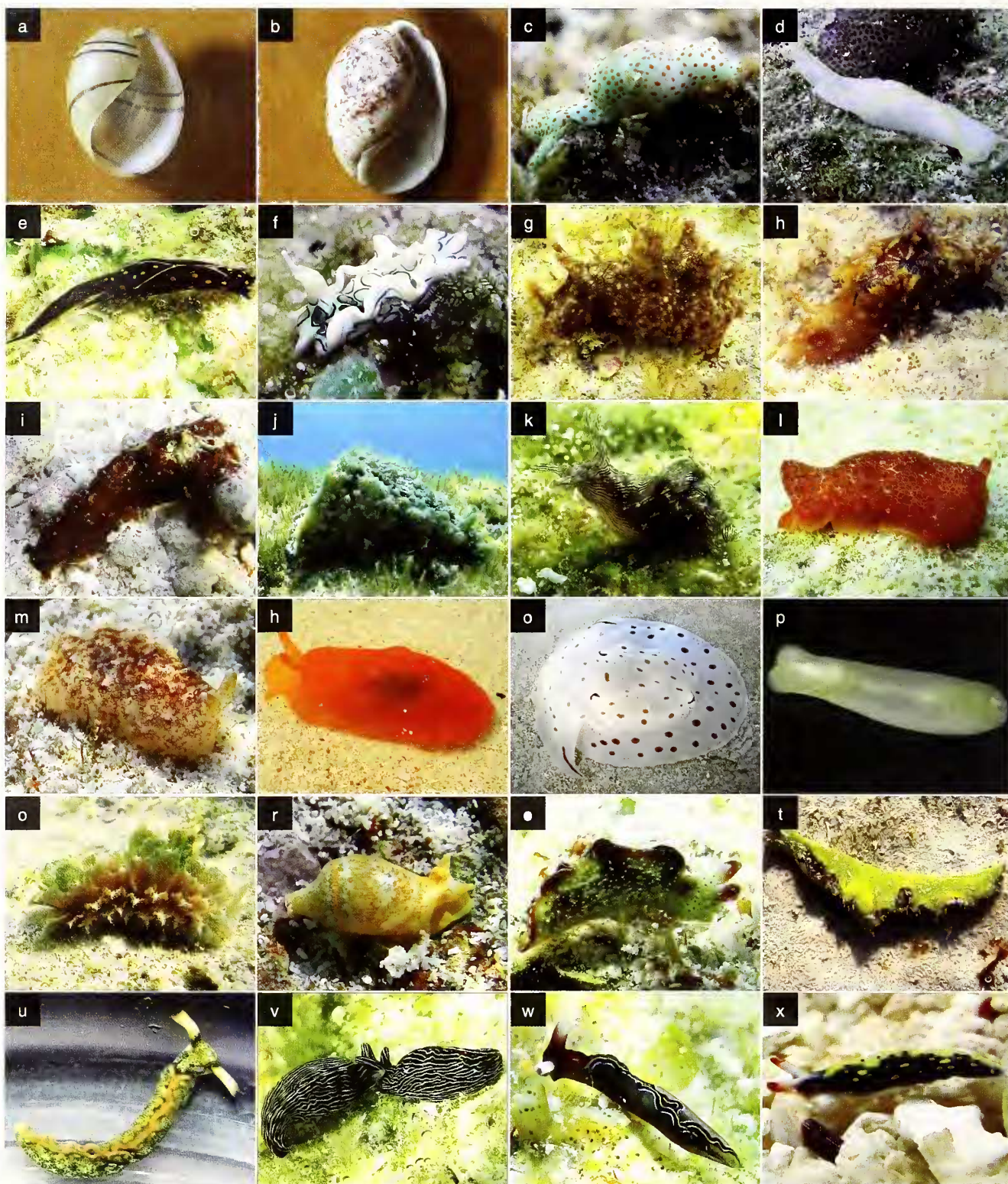


Fig. 1: a. *Hydatina velum*; b. *Bulla ampulla*; c. *Haminoea cymbalum*; d. *Chelidonura electra*; e. *Chelidonura punctata*; f. *Sagaminopteron psychedelicum*; g. *Aplysia dactylomela*; h. *Aplysia parvula*; i. *Dolabrifera dolabrifera*; j. *Dolabella auricularia*; k. *Stylocheilus striatus*; l. *Pleurobranchus peroni*; m. *Pleurobranchus albiguttatus*; n. *Berthellina cf. delicata*; o. *Euselenops luniceps*; p. *Phanerophthalmus smaragdinus*; q. *Polybranchia orientalis*; r. *Volvatella vigourouxii*; s. *Elysia ornata*; t. *Elysia tomentosa*; u. *Thuridilla carlsoni*; v. *Thuridilla gracilis*; w. *Thuridilla livida*; x. *Thuridilla vatae*

Live animal is uncommon in the lagoon reef.

Status: Uncommon.

Family: Bullinidae

***Bulla ampulla* Linnaeus, 1758** (Fig. 1b)

India: Widely distributed both on east and west coast of India.

Extralimital Distribution: Widely distributed in Indo-Pacific region.

Size: 20 mm.

Description: The white shell with profuse dark to light brown mottling is solid and with a large body whorl. Seasonal congregation of this species is common. It mostly occurs on sand flats.

Status: Abundant.

Family: Haminaeidae

***Haminoea cymbalum* (Quoy and Gaimard, 1835)** (Fig. 1c)

India: There are only two records of this species in India; Gulf of Mannar (Fontana *et al.* 2001) and Lakshadweep, a new record from the present study.

Extralimital Distribution: Mozambique and Madagascar to Indonesia and Hawaii. Western Pacific and western Indian Ocean.

Size: 25 mm.

Description: Shell is fragile and transparent. Animal is brilliantly coloured. The light green ground colour is profusely spotted with crimson red spots and light orange mottling. Foot is short with crimson red spots. Egg cases are white and glued together with a gelatinous substance. Eggs are laid on dead coral boulders. Individuals form long chains during breeding congregations. Seasonal congregations are common and usually between October to March.

Status: Seasonally abundant.

Family: Aglajidae

***Chelidonura electra* Rudman, 1970** (Fig. 1d)

India: Lakshadweep.

Extralimital Distribution: Indonesia Papua New Guinea, Australia, Solomon Is., Madagascar, Tropical Indo-West Pacific.

Size: 25 mm.

Description: A snow-white slug with a bright yellow border. A distinct tail-like extension of the foot is a typical character of the genus.

Status: Rare.

***Chelidonura punctata* Eliot, 1903** (Fig. 1e)

India: Lakshadweep.

Extralimital Distribution: Tanzania, Madagascar, Thailand, Myanmar, Mauritius, Maldives, Reunion Island.

Size: 25 mm.

Description: A deep blue-black slug with bright orange

spots, it forms small aggregations during the breeding period. It occurs mostly on coral rubble covered with encrusting algae.

Status: Seasonally common.

Family: Gastropteridae

***Sagaminopteron psychedelicum* Carlson and Hoff, 1974** (Fig. 1f)

India: Lakshadweep.

Extralimital Distribution: Japan, South Africa, Philippines, Guam, Malaysia, Seychelles, Papua New Guinea, Red Sea, Fiji, Taiwan.

Size: 4 mm.

Description: It grows up to 12 mm; is associated with *Dysidia* sponges on which it feeds.

Status: Very rare.

Family: Aplysiidae

***Aplysia dactylomela* Rang, 1828** (Fig. 1g)

India: Widely distributed in India.

Extralimital Distribution: Red Sea, Africa, Hawaii, South Pacific, Australia, Japan, Sri Lanka, Caribbean.

Size: 600 mm.

Description: A large animal, it is usually seen in large congregations, mostly in shallow waters, during winter months. The shell is considerably reduced in this species and is present inside the body. It shows remarkable colour variations. In Lakshadweep, the dull brown ground colour is dotted with black and white spots. Mantle is bordered in pink. Specimens from Gulf of Kutch are usually dull green with black spots. The pink lining of the mantle flap is also absent. The animals release a purple dye if disturbed.

Status: Abundant.

***Aplysia parvula* Morch, 1863** (Fig. 1h)

India: Lakshadweep.

Extralimital Distribution: Circumtropical.

Size: 8 mm.

Description: A small *Aplysia* it grows up to 20 mm. Body is light brown with white spots. It is also profusely dotted with white. Mantle edge and tips of rhinophores are peacock blue.

Status: Rare.

***Dolabrifera dolabrifera* (Cuvier, 1817)** (Fig. 1i)

India: Lakshadweep.

Extralimital Distribution: Circumtropical.

Size: 150 mm.

Description: A large slug, it is mostly seen in shallow waters of coral reefs. It is nocturnal and remains hidden under algal mass during day time. The animal is light green to dark brown in colour. Rear part of the body is squarish and flattened. Mantle is fully covered with fleshy extensions. Seasonally common, it forms large aggregations for breeding.

Status: Abundant.



Fig. 2: a. *Plakobranchus ocellatus*; b. *Aegires* sp.; c. *Gymnodoris* sp.; d. *Gymnodoris ceylonica*; e. *Gymnodoris alba*; f. *Chromodoris* cf. *setoensis*; g. *Chromodoris fidelis*; h. *Glossodoris cincta*; i. *Hypselodoris maculosa*; j. *Hypselodoris infucata*; k. *Hypselodoris maridadilus*; l. *Peltodoris murrea*; m. *Jorunna rubescens*; n. *Jorunna funebris*; o. *Platydoris cruenta*; p. *Halgerda tessellata*; q. *Asteronotus cespitosus*; r. *Phyllidia coelestis*; s. *Phyllidia varicosa*; t. *Phyllidia alyta*; u. *Phyllidia marindica*; v. *Phyllidiella pustulosa*; w. *Phyllidiella rosans*; x. *Phyllidiella zeylanica*

***Dolabella auricularia* (Lightfoot, 1786) (Fig. 1j)**

India: Lakshadweep.

Extralimital Distribution: Japan, Red Sea, Africa, Hawaii, Galápagos, Australia, Solomon Is., Madagascar.

Size: 300 mm.

Description: A large slug occurring on shallow reefs. Body surface is highly warty. The animal is light green with dark green tubercles or warts on dorsal surface. The rear part of the body is squarish and flattened. Antennae are short.

Status: Common.

***Stylocheilus striatus* (Quoy & Gaimard, 1832) (Fig. 1k)**

India: Lakshadweep.

Extralimital Distribution: Circumtropical, Japan, South Africa, Mexico.

Size: 30 mm.

Description: A small slug seen on coral sand. Large aggregations for short periods are common during winter. Animals are light grey to green with longitudinal lines running across the body up to the foot. Antennae are also lined in black. A close examination will reveal brilliant blue spots circled with a yellowish band.

Status: Seasonally abundant.

Family: Pleurobranchidae

***Pleurobranchus peroni* Cuvier, 1804 (Fig. 1l)**

India: Lakshadweep.

Extralimital Distribution: South Africa to Red Sea, Australia, Indonesia, Japan, UAE, Norfolk Is. (South Pacific), New Zealand.

Size: 50 mm.

Description: A large slug with an extremely soft body. The light yellow ground colour is profusely spotted with dark orange spots. Foot is light yellow. Rhinophores are orange and ribbed.

Status: Uncommon.

***Pleurobranchus albiguttatus* (Bergh, 1905) (Fig. 1m)**

India: Lakshadweep.

Extralimital Distribution: South Africa, Japan, Australia, New Caledonia, Red Sea, Reunion Island, Saudi Arabia, Philippines, Red Sea.

Size: 30 mm.

Description: A small slug, it inhabits shallow reef areas, and mostly remains under coral boulders during day time. Mantle has polygonal markings with scattered white triangular markings. Foot and rhinophores have yellowish brown spots.

Status: Common.

***Berthellina cf delicata* (Pease, 1861) (Fig. 1n)**

India: Gulf of Kutch.

Extralimital Distribution: Philippines, French Polynesia.

Size: 35 mm.

Description: A small slug, it occurs on reef sand. Body colour is deep orange with light orange foot. Rhinophores are light orange.

Status: Common.

***Euselenops luniceps* (Cuvier, 1817) (Fig. 1o)**

India: Gulf of Mannar, Chennai.

Extralimital Distribution: Philippines to Australia, Fiji, Hawaii, tropical Indo-West Pacific. Also known from South Africa and Tanzania.

Size: 75 mm.

Description: It is a large sea slug which mostly remains on sand flats. The white ground colour is profusely spotted with deep brown spots. When disturbed it quickly disappears under sand. It can swim short distances. Its perfect camouflage makes it difficult to find.

Status: Very Rare.

Family: Smaragdinellidae

***Phanerophthalmus smaragdinus* (Ruppell & Leuckart, 1828) (Fig. 1p)**

India: Lakshadweep.

Extralimital Distribution: Indonesia, Reunion Island, Philippines, Japan.

Size: 15 mm.

Description: This small slug has an internal shell. It inhabits shallow reef areas and mostly remains under coral boulders or coral sand. The animal is light green in colour.

Status: Common.

Family: Polybranchiidae

***Polybranchia orientalis* (Kelaart, 1858) (Fig. 1q)**

India: Gulf of Mannar, Lakshadweep.

Extralimital Distribution: Japan, Sri Lanka, South Africa, Hawaii, New Caledonia, Australia.

Size: 30 mm.

Description: A small nocturnal slug seen in reefs. Animal is translucent green with dark green cerata. In some individuals, cerata colour at the base is light brown to cream. Body surface bears many leaf-like cerata. On slightest physical touch, the animal automizes the cerata. It lays eggs under dead coral rocks, and the egg mass is white in colour. Egg cases are laid in circular rings.

Status: Common.

Family: Volvatellidae

***Volvatella vigourouxii* (Montrouzier in Souverbie, 1861) (Fig. 1r)**

India: Lakshadweep.

Extralimital Distribution: Australia, New Caledonia.

Size: 20 mm.

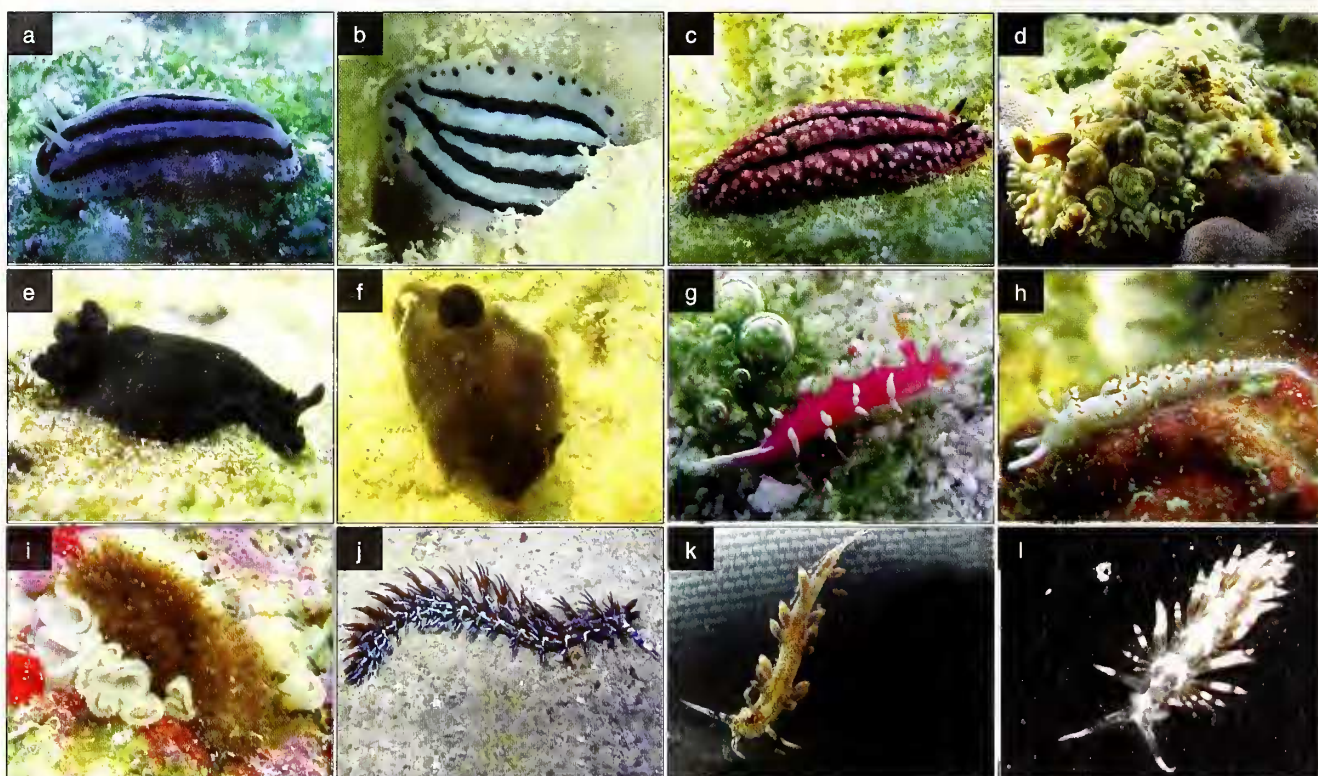


Fig. 3: a. *Phyllidiopsis phippiensis*; b. *Phyllidiopsis striata*; c. *Phyllidiopsis gemmata*; d. *Dendrodoris tuberculosa*; e. *Dendrodoris nigra*; f. *Actinocyclus verrucosus*; g. *Marianina rosea*; h. *Flabellina bicolor*; i. *Phestilla lugubris*; j. *Pteraeolidia ianthina*; k. *Herviella affinis*; l. *Herviella alba*

Description: It is a shelled sacoglossan sea slug. Shell is external, delicate and transparent. The animal is yellow with red spots. It is active during day and seen in shallow lagoon reef. It was found in the pool with thick growth of *Caulerpa racemosa*.

Status: Uncommon.

Family: Elysiidae

Elysia oruata (Swainson, 1840) (Fig. 1s)

Syn: *Elysia grandifolia* Kelaart, 1858

India: Gulf of Mannar, Gulf of Kutch, Andaman and Nicobar.

Extralimital Distribution: South Africa to Maldives, Australia to Hawaii, Red Sea to Polynesia, Norfolk Is. (South Pacific), Indonesia, Taiwan, French Polynesia, Circumtropical.

Size: 20 mm.

Description: These small sea slugs are herbivorous. They feed by sucking sap from green algae *Caulerpa racemosa* and *Codium* sp. The species shows remarkable colour variation. It is usually a translucent green with a black parapodial margin and a submarginal yellow or orange band. Body is covered with numerous black and white dots. The specimens from Gulf of Kutch are much lighter in colour and usually light green with black dots. Tips of rhinophores are deep purple in colour.

Status: Common.

Elysia tomentosa Jensen, 1997 (Fig. 1t)

India: Gulf of Kutch, Ratnagiri.

Extralimital Distribution: South Africa, Indo-West Pacific.

Size: 40 mm.

Description: A large *Elysia* seen on coral sand, it is deep green yellow in colour. The parapodia are lined by a black and pink band. Rhinophores are reddish brown. They usually occur among *Caulerpa racemosa*.

Status: Common.

Thuridilla carlsoni Gosliner, 1995 (Fig. 1u)

India: Lakshadweep.

Extralimital Distribution: New Caledonia, Papua New Guinea, Australia, Hawaiian Islands, Marshall Island, Indonesia, Philippines.

Size: 20 mm.

Description: These small sacoglossan slugs are herbivorous. Body bears green spots on a cream background. The parapodial flaps have a cream coloured edge. The rhinophores are cream with green base and light brown tips.

Status: Rare.

Thuridilla gracilis (Risbec, 1928) (Fig. 1v)

Syn: *Thuridilla ratna* (Marcus, 1965); *Thuridilla bayeri* (Marcus, 1965)

India: Lakshadweep.

Extralimital Distribution: Madagascar to Marshall Is., Papua New Guinea, Guam, Japan, Maldives, Philippines, Coral Sea, Polynesia to Red Sea.

Size: 20 mm.

Description: It is a small slug mostly active during late evenings. Animal is dark reddish brown in colour with bright yellow longitudinal lines. Brilliant blue spots also lie scattered on the surface. Parapodia are bright red, which can be seen only when the flaps are open.

Status: Abundant.

***Thuridilla livida* (Baba, 1955)** (Fig. 1w)

India: Lakshadweep.

Extralimital Distribution: Western Australia, Papua New Guinea, Guam, Marshall Island. Also known from South Africa, Aldabra and the Seychelles.

Size: 10 mm.

Description: It is a very small slug. The body colour is deep reddish brown. Parapodia are bright red, which can be seen only when the flaps are open. The parapodia are lined with a series of longitudinal lines of orange, black and blue. Head is deep red brown, rhinophores are dark brown at the base with white tips. It is a common species from reefs of Lakshadweep.

Status: Uncommon.

***Thuridilla vatae* (Risbec, 1928)** (Fig. 1x)

India: Lakshadweep.

Extralimital Distribution: Vanuatu, Australia, Reunion Island, South Africa, Philippines, Aldabra, Japan, Guam, and Marshall Islands.

Size: 10 mm.

Description: These small sacoglossan slugs are herbivorous. The body is blue black and profusely spotted with yellow. The rhinophores are white with red tips.

Status: Rare.

***Plakobranthus ocellatus* Hassett, 1824** (Fig. 2a)

India: Gulf of Kutch, Andaman.

Extralimital Distribution: Red Sea, Thailand, Japan, Australia to Hawaii, Solomon Is., South Africa, Philippines, Indonesia.

Size: 40 mm.

Description: It is a herbivorous slug. Body surface is very slimy. The species shows wide colour variation. The parapodia are light brown dotted with yellow spots. These spots are encircled with white rings. The base of parapodia bears large light blue spots encircled by black ring. These small sea slugs are burrowing in nature. They prefer sand flats with silty substrate.

Status: Abundant.

Family: Notodorididae

***Aegires* sp.** (Fig. 2b)

India: Lakshadweep.

Extralimital Distribution: Indonesia to Australia, Lord Howe Is. (South Pacific), Norfolk Is., Japan.

Size: 60 mm.

Description: Species from genus *Aegires* are significantly different being sluggish and having a tough leathery skin as compared to soft bodies of other nudibranchs. They feed on calcareous sponges. It is known that young individuals have black rhinophores, whereas adults have yellow. In young individuals, body surface is dotted with black spots, whereas the adult is uniformly yellow. The specimen is collected at 20 m depth. It is an uncommon species from Lakshadweep.

Status: Uncommon.

Family: Gymnodorididae

***Gymnodoris* sp.** (Fig. 2c)

India: Lakshadweep.

Extralimital Distribution: Not known.

Size: 30 mm.

Description: It is a small and uncommon sea slug. Body colour is yellow, profusely spotted with red spots. Rhinophores are yellow and ribbed. Gills are centrally placed on the dorsal side.

Status: Uncommon.

***Gymnodoris ceylonica* Kelaart, 1885** (Fig. 2d)

India: Gulf of Mannar.

Extralimital Distribution: Australia to Japan and across to Red Sea. Indo-West Pacific.

Size: 55 mm.

Description: Large congregations of this species can be seen in shallow lagoon waters of Lakshadweep during October-November. Mostly present on sandy substrate. The white-coloured body is profusely spotted with red spots. The foot has bright red margin. Gills are centrally placed. Body is transparent to the extent that internal body organs, as well as yellow strands of egg capsules, are clearly visible. It prefers dead, broken coral pieces to lay eggs. Eggs are laid in yellow colour strands on coral rubble. They feed on *Stylocheilus striatus*.

Status: Seasonally common.

***Gymnodoris alba* (Bergh, 1877)** (Fig. 2e)

India: Lakshadweep.

Extralimital Distribution: Japan, China, Indonesia, Australia, Hawaii, Singapore, Philippines, Southern Africa.

Size: 20 mm.

Description: It is a small sea slug and mostly found on sandy substrate. The light orange or cream coloured body is profusely spotted with bright orange spots. Rhinophores are white or pale orange. Gills are white.

Status: Uncommon.

Family: Chromodorididae***Chromodoris cf setoensis* Baba, 1938 (Fig. 2f)****India:** Lakshadweep.**Extralimital Distribution:** Northern Indian Ocean, West Pacific, Sri Lanka, Arabian Sea, Lord Howe Is. (South Pacific).**Size:** 16 mm.**Description:** It is a tiny sea slug from reefs. Ground colour is white with a highly decorated surface. Mantle margin is deep orange. A row of deep purple spots along mantle margin are distinctly visible. Three white lines run longitudinally on the back of which one is centrally positioned. All the three lines meet each other at both the ends. Rhinophores and gills are white and ribbed. Foot is short and white in colour. However, Rudman (1986) considers it as a colour form of *C. decora* (Pease 1860).**Status:** Uncommon.***Chromodoris fidelis* (Kelaart, 1858) (Fig. 2g)****India:** Lakshadweep, Andaman.**Extralimital Distribution:** New Caledonia, Hong Kong, Japan, Red Sea, Australia, Seychelles, Indonesia, Malaysia, Papua New Guinea.**Size:** 35 mm.**Description:** The base colour is white with brilliant deep red colour undulating margin. The white and red colour is separated by a continuous black band. Foot is white. Rhinophores and gills are black and ribbed.**Status:** Uncommon.***Glossodoris cincta* (Bergh, 1888) (Fig. 2h)****India:** Lakshadweep.**Extralimital Distribution:** Red Sea to Tanzania across to Japan and Fiji, Papua New Guinea, Australia, Maldives, Hong Kong.**Size:** 60 mm.**Description:** A medium-sized sea slug that remains inside crevices during the day. The species has three colour forms: Red Sea-East Africa; Maldives-N. Australia and W. Pacific. The body colour is deep red brown. Mantle flaps are frilled and brilliant blue and yellow. Foot is deep red brown with a blue margin. Rhinophores are ribbed and blue with a red base. Gills are white with blue edge.**Status:** Uncommon.***Hypselodoris maculosa* (Pease, 1871) (Fig. 2i)****Syn:** *Chromodoris decorata* (Risbec, 1928)**India:** Lakshadweep.**Extralimital Distribution:** Tanzania, Red Sea, Philippines, Australia, China, Vietnam, Japan, Indonesia, Papua New Guinea, Lord Howe Is. (South Pacific).**Size:** 30 mm.**Description:** The ground colour is white with a brilliant deep red and undulating margin. Head and tail

portion is dotted with white spots. Foot is light purple with white spots. Rhinophores are stalked, white and ribbed with two distinct orange bands. Gills are white with two distinct orange bands.

Status: Uncommon.***Hypselodoris infucata* (Ruppell & Leuckart, 1828) (Fig. 2j)****India:** Gulf of Kutch.**Extralimital Distribution:** Indo-West Pacific, India, Red Sea, Indonesia, Vietnam, New Caledonia, Israel. South Africa, Philippines.**Size:** 30 mm.**Description:** The ground colour is light purple grey profusely spotted with black and yellow spots. Rhinophores are red and finely ribbed. Gills are white with a red margin.**Status:** Very rare.***Hypselodoris maridadilus* Rudman, 1977 (Fig. 2k)****India:** Lakshadweep.**Extralimital Distribution:** Maldives, Tanzania, South Africa, Mauritius, Kenya, Red Sea, Hawaii.**Size:** 20 mm.**Description:** It is a small and brilliantly coloured sea slug. Five purple-violet bands are present on the yellow orange ground colour. The foot and mantle have a purple border. Rhinophores and gills are deep orange red.**Status:** Very Rare.**Family: Discodorididae*****Peltodoris murrea* (Abraham, 1877) (Fig. 2l)****Syn:** *Peltodoris mauritiana* Bergh, 1889**India:** Gulf of Kutch.**Extralimital Distribution:** Maldives, Mauritius, Reunion to New Caledonia and Japan.**Size:** 30 mm.**Description:** A small *Peltodoris* usually seen in shallow pools and under coral boulders. Body is white with a few black spots. Rhinophores are yellow.**Status:** Uncommon.**Family: Kentrodorididae*****Jorunna rubescens* Bergh, 1876 (Fig. 2m)****Syn:** *Kentrodoris rubescens* (Bergh, 1876)**India:** Lakshadweep.**Extralimital Distribution:** Mauritius, Sri Lanka, Australia, Papua New Guinea, Indonesia, Malaysia, Philippines, Solomon Is., Japan, Vietnam.**Size:** 200 mm.**Description:** This large slug is nocturnal and can be encountered easily in shallow lagoons of Lakshadweep during night dives. Body is soft. Brachial pocket is large which encloses gills and is present in the centre of the body. Rhinophores are ribbed and enclosed in a large pocket. Ground

colour is creamy pink with irregular longitudinal brown lines. Egg capsules are pink and laid in circular rings.

Status: Abundant.

***Jorunna funebris* (Kelaart, 1858) (Fig. 2n)**

India: Gulf of Kutch, Andaman and Nicobar, Gulf of Mannar, Lakshadweep.

Extralimital Distribution: Red Sea, Oman, Maldives, Australia to Japan, Papua New Guinea, Hong Kong, Singapore.

Size: 50 mm.

Description: The surface of this sea slug has a rough texture, a typical character of the genus. Black rings present on the white body are rough to touch. Rhinophores are black and ribbed with a white base. Gills are black. Breeding pairs are common in shallow lagoons of Lakshadweep during winter.

Status: Abundant.

Family: Platydorididae

***Platydoris cruenta* (Quoy and Gaimard, 1832) (Fig. 2o)**

Syn: *Platydoris striata* (Kelaart, 1858)

India: Lakshadweep.

Extralimital Distribution: Red Sea, Christmas Island, Indo-West Pacific.

Size: 20 mm.

Description: It is a small, bright yellow orange slug profusely marked with bright red to brown irregular lines. Rhinophores are yellow and highly ribbed. Gills are yellow with brown margin.

Status: Uncommon.

Family: Dorididae

***Halgerda tessellata* (Bergh, 1880) (Fig. 2p)**

India: Lakshadweep.

Extralimital Distribution: Madagascar, Kenya, Thailand to Micronesia, Australia, Maldives, Mozambique, South Africa and East Africa, Japan.

Size: 20 mm.

Description: This small sea slug is abundantly seen in Lakshadweep reefs. It is mostly active in the late evening. The body colour is deep orange yellow with serrated outcrops. Surface bears dark brown squarish and large spots, which are scattered with silvery white spots. Rhinophores are stalked, ribbed and black in colour. A black line runs from the tip of the rhinophores to the bottom of the rhinophores. Gills are brown; foot is long and has a median brown line.

Status: Abundant.

***Asteronotus cespitosus* (Hasselt, 1824) (Fig. 2q)**

Syn: *Doris cespitosus* Van Hasselt, 1824, *D. mauritiana* Quoy & Gaimard, 1832, *D. foetida* Pease, 1860.

India: Lakshadweep, Andaman.

Extralimital Distribution: Australia, Red Sea, Hawaii,

Tanzania, UAE, Maldives, Japan, Sri Lanka, Chagos, Seychelles, Mauritius, Indonesia.

Size: 200 mm.

Description: It is a large sea slug. Light yellow brown in colour, surface is highly warty. Rhinophores are with short stalk, brown in colour and highly ribbed. Gills are feathery and brown in colour. Red semi-circular band on the foot is diagnostic of this species. Egg case is brilliant red in colour.

Status: Common.

Family: Phyllidiidae

***Phyllidia coelestis* Bergh, 1905 (Fig. 2r)**

India: Lakshadweep, Andaman.

Extralimital Distribution: South Africa to South China Sea, Australia to Fiji, Philippines, Japan, Papua New Guinea, Indonesia, Malaysia, Sri Lanka, Pacific Ocean, Indo-West Pacific Ocean.

Size: 60 mm.

Description: Body surface is highly warty and lacks dorsal gill. The base colour is blue to grey blue. The dorsal surface has three black bands of which the central black band has yellow tubercles and is broken. The rhinophores are yellow. The foot sole is grey and has no black line or markings as seen in *P. varicosa* and *P. elegans*.

Status: Abundant.

***Phyllidia varicosa* Lamarck, 1801 (Fig. 2s)**

Syn: *Phyllidia arabica* Ehrenbergh, 1831; *Phyllidia trilineata* Cuvier, 1804a; *Phyllidia borbonica* Cuvier, 1804b; *Phyllidia fasciolata* Bergh, 1869; *Phyllidia honloni* Risbec, 1956.

India: Lakshadweep, Andaman.

Extralimital Distribution: Mauritius, Seychelles, Red Sea, Sri Lanka to Hawaii, Japan, Africa, Papua New Guinea, Thailand, Malaysia, Australia.

Size: 90 mm.

Description: It is a large slug, and as in all other members of the family, the body surface is highly warty and lacks dorsal gills. The species shows remarkable variation in colour and body pattern. The rhinophores are yellow. The foot sole has a broken black median line.

Status: Abundant.

***Phyllidia alyta* Yonow, 1996 (Fig. 2t)**

India: Lakshadweep, Andaman.

Extralimital Distribution: Maldives.

Size: 90 mm.

Description: It is a large slug. Dorsal surface bears four longitudinal black lines. Of these, the central two begin just behind the rhinophores till the anal papilla. A black band is distinctly visible connecting both rhinophores. The rhinophores are light to deep yellow or orange-yellow. The foot sole has a broken black median line.

Status: Common.

***Phyllidia marindica* (Yonow and Hayward, 1991) (Fig. 2u)**

Syn: *Fryeria ruppellii* Bergh, 1889; *Fryeria pustulosa* Risbec, 1929.

India: Lakshadweep.

Extralimital Distribution: Thailand, Western Australia, Eastern Africa, Maldives.

Size: 20 mm.

Description: The base colour varies from black, blue to yellow. The dorsal surface bears several laterally running black stripes. Dorsal surface also bears a single median longitudinal ridge. Two black bands run on either side of this ridge. The rhinophores are yellow to gold in colour. Foot sole have no markings.

Status: Uncommon.

***Phyllidiella pustulosa* (Cuvier, 1804) (Fig. 2v)**

Syn: *Phyllidia verrucosa* Hasselt, 1824; *Phyllidia albonigra* Q & G, 1832; *Phyllidiella nobilis* Bergh, 1869; *Phyllidia spectabilis* Collingwood, 1881; *Fryeria varaibilis* Collingwood, 1881; *Phyllidia rotunda* Eliot, 1904; *Fryeria pustulosa* (Cuv).

India: Lakshadweep, Andaman.

Extralimital Distribution: Red Sea to Hawaii, Japan, Malaysia, Thailand, Indonesia, Australia, Western Pacific, Micronesia, Papua New Guinea, Fiji.

Size: 60 mm.

Description: It is a large sea slug. The base colour is black with pink pustules or tubercles, which are usually clustered in three. The pustules on the surface show variation in pattern. The rhinophores are black. Foot sole is grey.

Status: Common.

***Phyllidiella rosans* (Bergh, 1873) (Fig. 2w)**

Syn: *Phyllidia nigra* Pease, 1868; *Phyllidia bourgini* Risbec, 1928; *Phyllidia soria* Er. Marcus & Ev. Marcus, 1970; *Phyllidiopsis* cf. *striata* Edmunds, 1972; *Phyllidia mediocris* Yonow & Hayward, 1991.

India: Lakshadweep.

Extralimital Distribution: East Africa, Reunion, Maldives to Hawaii, Tahiti, Seychelles, Japan.

Size: 35 mm.

Description: Among the *Phyllidiella* this is the most common sea slug. It shows remarkable variations in colour and pattern. Dorsum is black with longitudinal pink ridges. The rhinophores are black with pale pink stalk. The foot sole has numerous tiny spots.

Status: Abundant.

***Phyllidiella zeylanica* (Kelaart, 1859) (Fig. 2x)**

Syn: *Phyllidia ceylanica* Bergh, 1869; *Phyllidia nobilis* Eliot, 1904; *Phyllidia varicosa* Farran, 1905; *Phyllidia catena* Pruvot-Fol, 1956; *Phyllidia seriata* Pruvot-Fol, 1957a; *Phyllidia empelia* Yonow, 1984a; *Phyllidia meandrina* Yonow

& Hayward, 1991; *Phyllidia honloni* Wells *et al.*, 1990.

India: Gulf of Kutch, Lakshadweep, Andaman.

Extralimital Distribution: Western Pacific, Seychelles, Thailand, Reunion, Eastern Africa.

Size: 50 mm.

Description: A medium-sized *Phyllidiella* which resembles *P. rosans* closely. The dorsal surface is black with pink ridges. The rhinophores are black. The foot sole is white.

Status: Common.

***Phyllidiopsis phiphensis* Brunckhorst, 1993 (Fig. 3a)**

India: Lakshadweep.

Extralimital Distribution: Known only from Andaman Sea, Northern Indian Ocean and Thailand, Madagascar.

Size: 20 mm.

Description: A small sea slug usually seen below 8 m depth. White rhinophores are diagnostic along with three black stripes on the dorsal surface. The marginal areas have black spots. The species is named after the locality from where it was first described 'Phi Phi Island'.

Status: Rare.

***Phyllidiopsis striata* Bergh, 1888 (Fig. 3b)**

India: Lakshadweep.

Extralimital Distribution: Red Sea, Thailand to Marshall Is., Japan, Papua New Guinea, and Micronesia.

Size: 15 mm.

Description: A small sea slug. The dorsal surface is white with four black longitudinal lines. Three tuberculate ridges originate from anus opening. The central ridge terminates just before rhinophores and remaining two run through rhinophoral openings. The rhinophores are lemon yellow. Black marginal dots are also visible. The specimen was seen feeding on dead giant clam flesh.

Status: Rare.

***Phyllidiopsis gemmata* (Pruvot-Fol, 1957) (Fig. 3c)**

India: Lakshadweep.

Extralimital Distribution: Thailand, Indonesia, Reunion Island.

Size: 40 mm.

Description: This elegant species is commonly seen. The background colour varies from ink to grey. The dorsal surface bears four distinct black lines of which the outermost extend to the mantle edge. Rhinophores are black with a pink band at the base. Foot sole is grey.

Status: Common.

Family: Dendrodorididae***Dendrodoris tuberculosa* (Quoy & Gaimard, 1832)**

(Fig. 3d)

India: Lakshadweep, Andhra Pradesh.

Extralimital Distribution: Red Sea to Australia, Hawaii, Japan, South Pacific.

Size: 200 mm.

Description: A large sea slug usually seen in shallow pools and under rocks. They prefer muddy reefs. These slugs produce a powerful toxin that can affect skin and eyes, and gives a severe burning sensation. Surface is extremely warty, and dark brown with white patches. The lower part of the body has white spots, which is diagnostic for the species. Rhinophores are stalked. The stalk is dark brown and the rhinophores light brown in colour. Gills are light brown, leafy and highly branched.

Status: Uncommon.

Dendrodoris nigra (Stimpson, 1855) (Fig. 3e)

India: Lakshadweep.

Extralimital Distribution: Red Sea to Australia, Fiji, South Africa, Thailand, New Zealand, Japan, China, Hong Kong, Indonesia to Hawaii.

Size: 80 mm.

Description: A large and black coloured sea slug usually seen in shallow pools and under rocks. These sea slugs are nocturnal and can be seen during early mornings and late evenings. Rhinophores bear white tips in adults. Juveniles have red band on black mantle.

Status: Abundant.

Family: Actinocyclidae

Actinocyclus verrucosus Ehrenberg, 1831 (Fig. 3f)

India: Lakshadweep.

Extralimital Distribution: Red Sea, Madagascar, western Pacific to Hawaii.

Size: 60 mm.

Description: Not much is known about this species. Compared to other sea slugs this species has a tough leathery mantle. The dark brown mantle is also covered with rounded tubercles. It is nocturnal and usually seen under coral boulders.

Status: Rare.

Family: Tritoniidae

Marianina rosea (Pruvot-Fol, 1930) (Fig. 3g)

India: Lakshadweep.

Extralimital Distribution: Australia, New Caledonia, Marianas Is., South Africa, Indonesia.

Size: 10 mm.

Description: It is a very beautiful and tiny sea slug found mostly under coral rocks. It feeds primarily on hydroids. Base colour is deep pink with white cerata. Rhinophores are in pockets and orange in colour. Oral tentacles are white with pink base.

Status: Seasonally common.

Family: Flabellinidae

Flabellina bicolor (Kelaart, 1858) (Plate 3h)

India: Lakshadweep.

Extralimital Distribution: Widely distributed in Indo-Pacific, Papua New Guinea, Japan, Hong Kong, Maldives, South Africa to Hawaii.

Size: 20 mm.

Description: A tiny sea slug usually seen under rocks or among dead coral branches. It has a long and narrow body with numerous mantle outgrowths known as cerata on the body. Cerata are in pairs and have a distinct orange band on it. Besides cerata, the head also has a pair of oral tentacles. Rhinophores are bulbous and brown in colour. These are predators feeding on hydroids.

Status: Seasonally abundant.

Family: Tergipedidae

Phestilla lugubris (Bergh, 1870) (Fig. 3i)

India: Lakshadweep.

Extralimital Distribution: Tanzania, Indonesia, Australia, Hawaii, Japan, Vietnam, Hong Kong.

Size: 45 mm.

Description: These sea slugs are closely associated with *Porites lutea*, they feed on the polyps of this species. Body colour is light brown. Body surface bears numerous cerata. Each ceras is bulbous in nature with distinct white bands and ringed nodes.

Status: Uncommon.

Pteraeolidia ianthina (Angas, 1864) (Fig. 3j)

India: Lakshadweep, Gulf of Kutch.

Extralimital Distribution: Australia, Singapore, China, Vanuatu, Fiji, Japan, Hawaii, Madagascar, Seychelles.

Size: 50 mm.

Description: It is a large aeolid occurring on coral sand. Body is covered with numerous cerata. Tentacles have distinct purple bands. Nothing is known about this species in India.

Status: Very rare.

Family: Facelinidae

Herviella affinis Baba, 1960 (Fig. 3k)

India: Lakshadweep.

Extralimital Distribution: Japan.

Size: 10 mm.

Description: It is a small slug found on hydroids. Oral tentacles and rhinophores are smooth. Rhinophores have black speckling at the lower half and a black band. Upper half of the rhinophores is translucent yellowish white. The cerata are spindle shaped and bulbous just below the tip and arranged in single rows. The cerata are transparent with distal half being white with a central band of orange.

Status: Rare.

Herviella albida Baba, 1966 (Fig. 31)

India: Lakshadweep.

Extralimital Distribution: Australia, Japan.

Size: 15 mm.

Description: It is a small sea slug usually seen under coral boulders. It feeds on sea anemones. The oral tentacles and cerata are long, slender, and transparent with white tips. Cerata are long and bulbous at the centre with white bands at the top and centre. The body is transparent with white diamond shaped marks on the mantle.

Status: Rare.

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